



United Nations Statistics Division

International Recommendations for Energy Statistics - IRES

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Workshop on Energy Statistics for ASEAN Countries

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<http://unstats.un.org/unsd/energy>

Overview

- Historical context of energy statistics leading to IRES and the SDGs
- IRES and sustainable energy statistics
 - Renewables
 - Primary energy
 - Biomass
- Conclusion

Importance of energy stats

- Energy is fundamental for socio-economic development.
- Availability/access to energy is essential to poverty reduction
 - And improvements in the standards of living.
- As a result, there is a constantly increasing demand for energy
- Concerns about sustainability & reliability of current production and consumption patterns
 - And the impact of the use of fossil fuels on the environment.
- Taking into account these circumstances, quality energy statistics is of paramount importance
 - So that countries can design effective energy policies toward sustainable development.

Context

- Availability of high-quality energy statistics has always been a matter of concern for the statistical community.
- The United Nations Statistical Commission (UNSC) has discussed issues relevant to energy statistics since its inception (as part of economic statistics).
- Since the 1950's UNSD has been maintaining a database on energy statistics (data from 1950 to latest year available).
 - Accessible from the UNdata Portal (data.un.org/Explorer.aspx?d=EDATA)
- And publishing the Energy Statistics Yearbook
 - The 2014 Edition was the 58th edition
 - First Edition (1952) was called “World Energy Supplies in selected years, 1929-1950”

Statistics

Motor Gasoline Search glossaries

Source: Energy Statistics Database | United Nations Statistics Division

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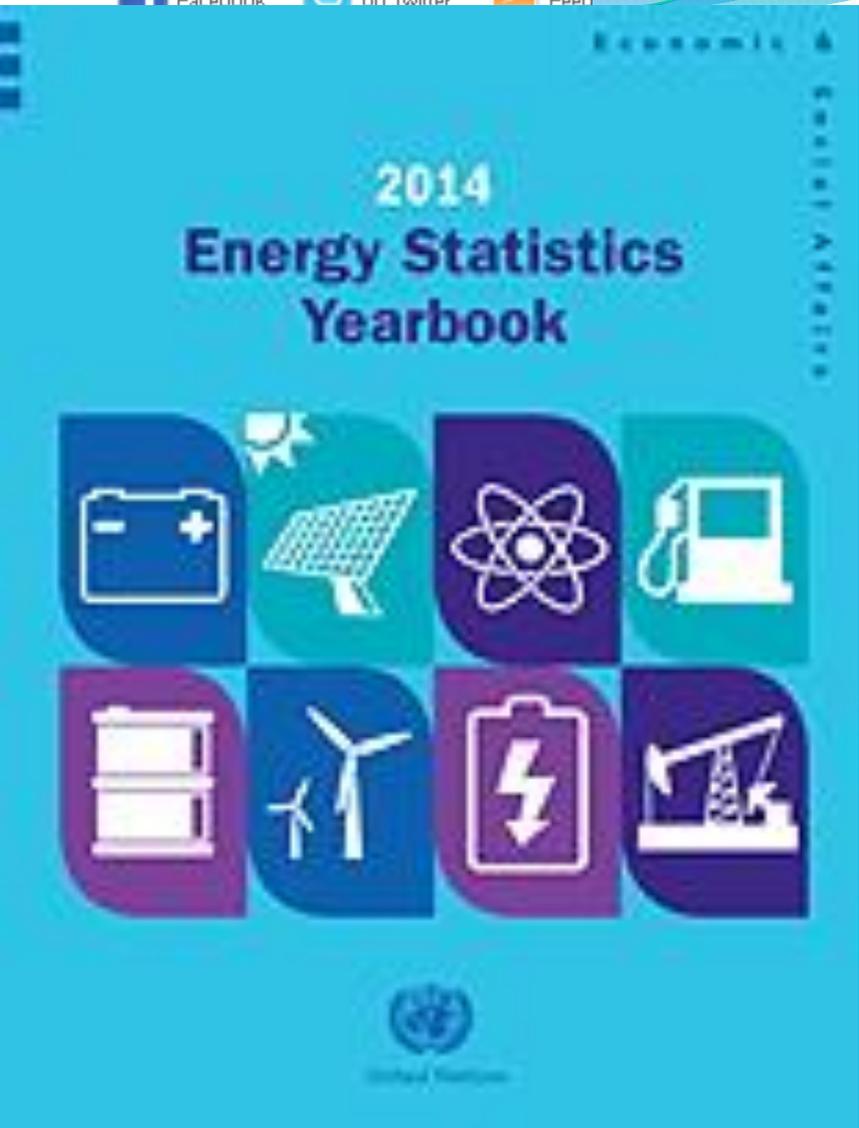
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Context (cont.)

- In the aftermath of early 1970s energy crisis, UNSC put energy statistics on its agenda as a separate item
 - and requested a special report on energy statistics to be prepared and presented to it for discussion.
- One of the outcomes was that UNSC agreed on the use of energy balances as the key instrument
 - in the coordination of work on energy statistics and
 - the provision of data in a suitable form for understanding and analysing the role of energy in the economy.
 - Since then UNSD has been publishing Energy Balances (and Electricity Profiles)

2014 Energy Balances



2014 Electricity Profiles



Context (cont.)

- The next few decades saw developments in energy statistics
 - with the incorporation of novel energy products and technologies;
 - and the publication of guidance documents:
- ***UN Concepts and Methods in Energy Statistics (1982)***
[Focused on Energy Accounts and Balances]
- ***UN Energy Statistics: Definitions, Units of Measure and Conversion Factors (1987)***
- ***UN Energy Statistics: A Manual for Developing Countries (1991)***
- ***IEA/EUROSTAT Energy Statistics Manual (2005)***

Context (cont.)

- Such guidance documents were rich in information and influenced country methodologies,
 - but were descriptive in nature, not focusing on harmonisation.
- These documents covered important topics but needed updates to reflect energy market developments.
- Guidance on energy balance compilation, classification of energy industries, treatment of newer biofuels was necessary.
- Additionally, references to other international classifications (ISIC, CPC, HS) were mostly absent.

Oslo Group & InterEnerStat

In this context, in 2005, UNSC recognised need for further development of energy statistics guidance and set up:

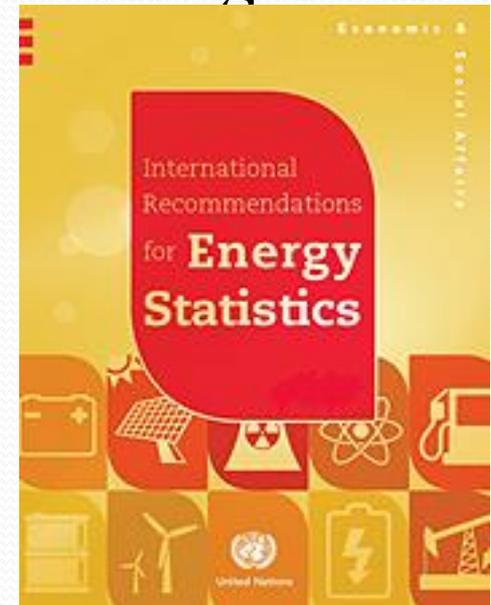
- Oslo City Group on Energy Statistics (Oslo Group)
 - to “contribute to the development of improved methods and international standards for national official energy statistics”.
- Intersecretariat Working Group on Energy Statistics (InterEnerStat).
 - to harmonise differing definitions across organisations as close as possible

Oslo Group & InterEnerStat

- In the Oslo Group the main actors are the countries, working under UNSD supervision
- InterEnerStat is a group of over 20 international organisations working in the field of energy statistics, headed by the IEA
 - It published a harmonised list of energy products and flows in 2010.

IRES

- Building on the harmonisation work achieved by InterEnerStat, the Oslo Group helped draft the *International Recommendations for Energy Statistics* (IRES)
- With the main goal of providing standards and guidance to national compilers covering:
 - relevant concepts and definitions,
 - classifications,
 - data sources and compilation methods,
 - institutional arrangements,
 - data quality assurance,
 - metadata and dissemination policies.
- IRES was endorsed by UNSC in 2011 .



Energy statistics and the 2030 Agenda for Sustainable Development, SDGs

- IRES's endorsement was a timely one, since one of the major outcomes from the Rio+20 Conference was the development of a set of Sustainable Development Goals (SDGs) in which SDG7 is a dedicated stand-alone SDG on energy
- SDG7 has three major targets and two additional targets representing means of implementation.
- The set of SDGs is an essential element of the 2030 Agenda for Sustainable Development to be implemented for the 2016-2030 period, including a total of 17 SDGs, 169 targets and 241 indicators.

SDG 7 - Ensure access to affordable, reliable, sustainable and modern energy for all

Target	Indicator
7.1 By 2030, ensure universal access to affordable, reliable and modern energy services	7.1.1 Proportion of population with access to electricity
	7.1.2 Proportion of population with primary reliance on clean fuels and technology
7.2 By 2030, increase substantially the share of renewable energy in the global energy mix	7.2.1 Renewable energy share in the total final energy consumption
7.3 By 2030, double the global rate of improvement in energy efficiency	7.3.1 Energy intensity measured in terms of primary energy and GDP
7.a By 2030, enhance international cooperation... (means of implementation)	7.a.1 Mobilized amount of US\$...
7.b By 2030, expand infrastructure and upgrade technology... (means of implementation)	7.b.1 Investments in energy efficiency ...

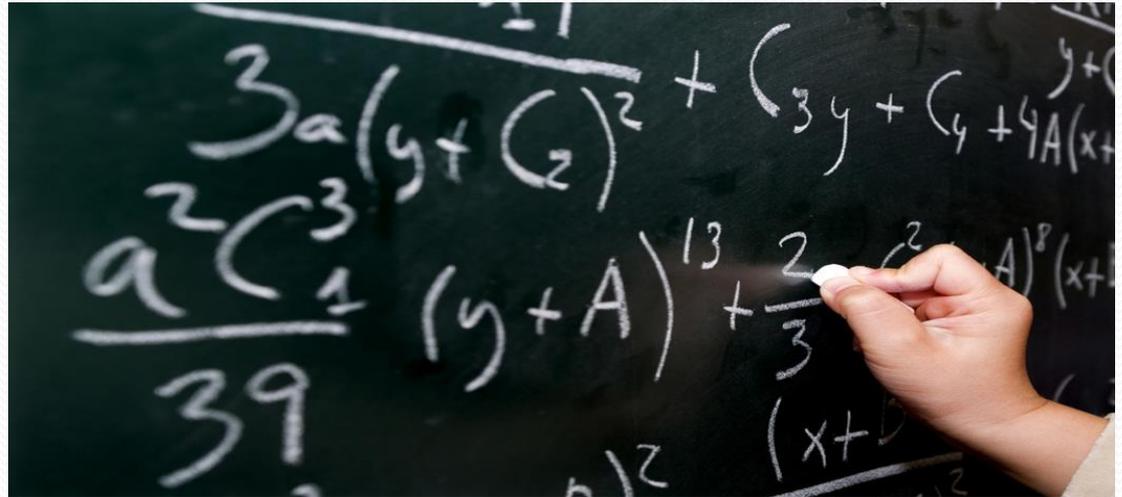
IRES, SIEC and ESCM

- IRES contains the Standard International Energy product Classification (SIEC)
 - first definitive standard classification for energy products.
 - built on a set of internationally harmonised definitions of energy products
 - developed by InterEnerStat as mandated by the UNSC.
- As a practical companion to the more theoretical IRES, the *Energy Statistics Compilers Manual* (ESCM), bountiful with country examples, was drafted and is undergoing final edition and formatting.

IRES

- *International Recommendations for Energy Statistics* improves comparability across products, flows & countries
- By defining:
 - What an energy product is;
 - Concept of production (and all other flows to be measured);
 - Scope of energy statistics.
- By providing:
 - Standard International Energy Product Classification (SIEC), with links to CPC and HS;
 - Harmonized definitions;
 - List of renewable products;
 - And much more (<https://unstats.un.org/unsd/energy/ires>)
- ESCM the accompanying compilers' manual (w/ country examples)

IRES is about definitions of flows/products:
THEORETICAL



ESCM is about practical guidance and country examples:
PRACTICAL

ESCM - Some Examples

Austria: Adding an energy module to Labor Force Survey increased the response rate and reduced costs

Bulgaria: NSO's metadata policy

Norway: lessons from publishing preliminary monthly statistics and balances

UK: Energy Efficiency Data framework measures the result of energy efficiency policies

South Africa: experience with social media and dissemination in a developing country

FAO guidance on fuelwood surveys

Confidentiality practices for many countries

Azerbaijan: producing full commodity balances for all products

Legal frameworks for many countries

And many more!

Renewables

- IRES offers no definition of renewable energy
 - Difficulty to come up with a technically correct definition that includes/excludes all that we want included/excluded
 - Difficulty to disentangle the concepts of renewability and sustainability
- Instead, it offers a list of renewable energy products and sources.

Primary and secondary energy

- Which energy product is primary and which is secondary is determined by the principle of multiple uses:
 - the primary energy form should be the first energy form downstream in the production process for which multiple energy uses are practical.
- For electricity and heat, the application of this principle leads to the choice of the following primary energy forms:
 - Heat for nuclear, geothermal and solar thermal;
 - Electricity for hydro, wind, tide, wave and other marine, and solar photovoltaic.
- In the absence of measurement of heat input, it is assumed efficiencies of 33.3% for nuclear and solar thermal and 10% for geothermal electricity.

	Primary products	Secondary products
Non-renewables	<ul style="list-style-type: none"> - Hard coal - Brown coal - Peat - Oil shale - Natural gas - Conventional crude oil - Natural gas liquids (NGL) - Additives and oxygenates - Industrial waste - Municipal waste (partially¹) - Nuclear Heat - Heat from chemical processes 	<ul style="list-style-type: none"> - Coal products - Peat products - Refinery feedstocks - Oil products - Electricity and heat from combusted fuels of fossil origin - Electricity derived from heat from chemical processes and nuclear heat - Any other product derived from primary/secondary non-renewable products
Renewables	<ul style="list-style-type: none"> - Biofuels (except charcoal) - Municipal waste (partially¹) - Heat from renewable sources², except from combusted biofuels - Electricity from renewable sources², except from geothermal, solar thermal or combusted biofuels 	<ul style="list-style-type: none"> - Charcoal - Electricity and heat from combusted biofuels - Electricity from geothermal and solar thermal - Any other product derived from primary/secondary renewable products

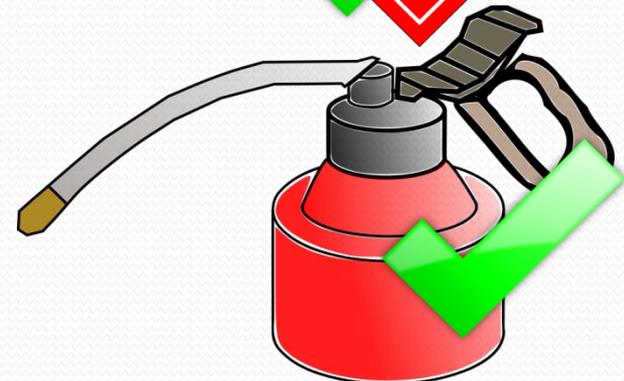
The Concept of Production

- 5.10: Primary production is the capture or extraction of fuels or energy... within the national territory in a form suitable for use. Inert matter removed from the extracted fuels and quantities reinjected, flared or vented are not included.

Data for oil and gas production should be NET of reinjected, flared and vented quantities (and water, sand etc.)



- 2.9 “Energy products” refers to products exclusively or mainly used as a source of energy. Biomass and waste included only when used for energy purposes
 - Wood, ethanol excluded when not used as an energy product.
 - Fossil fuels always included by definition, even when used for non-energy purposes (e.g. lubricants).



IRES: Scope of Energy Statistics

- 2.18: it's important that data on the production of energy outside energy industries is also collected and included in total energy production.
 - Results: fuelwood collected and used non-commercially needs to be properly accounted for;
 - By-products used for energy (e.g., bagasse)
 - And small “teapot” have their output not included under tra



Data items for specific products: Coal and Electricity

For each major product, IRES provides product-specific flows to collect

	COAL
Item number	Data item
2.1	Production
2.1.1	Of which: Underground
2.1.2	Of which: Surface
2.2	Production from other sources

	ELECTRICITY
5.1	Gross Production (by type of producer, by type of plant and by production process) ^a
5.2	Own Use
5.3	Net Production (by type of producer, by type of plant and by production process) ^a
5.4	Use of energy products (by energy products and by transformation processes)

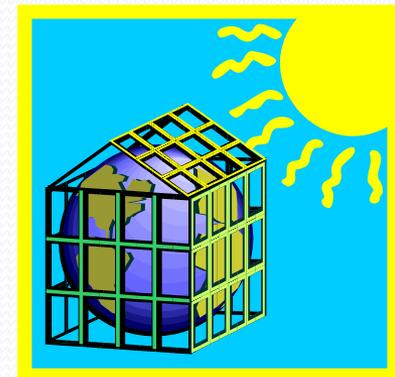
Data items for specific products: Oil and Gas

NATURAL GAS	
Item number	Data item
3.1	Production
3.1.1	Of which: Associated gas
3.1.2	Of which: Non-associated gas
3.1.3	Of which: Colliery and Coal Seam Gas
3.2	Production from other sources
3.3	Extraction losses ^a
3.3.1	Of which: gas flared
3.3.2	Of which: gas vented
3.3.3	Of which: gas re-injected
3.4	Gas flared (except during extraction)
3.5	Gas vented (except during extraction)

OIL AND OIL PRODUCTS	
Item number	Data item
4.1	Backflows from petrochemical industry to refineries
4.2	Refinery intake (by products)
4.3	Refinery losses
4.4	Direct use (of crude oil, NGL, etc.)

Bunkers and Non-Energy Use

- IRES 5.14/5: For the purposes of energy statistics, exclude International Marine and Aviation Bunkers from exports and supply
- IRES 5.5: It's important to separately identify the non-energy part of final consumption.
- Why? Both important principles for accurate GHG emission inventories



IRES Calorific Values

- Units for Dissemination: mass (kt) for coal and oil, Terajoules (GCV) for natural gas, TJ (NCV) for solid biofuels and wastes (IRES 4.29).
- Net calorific values (aka lower heating values) should be used to compile balances in TJ (IRES 4.36), as interest lies in *useful* energy output and TJ is a SI unit.
- Country-specific calorific values should be collected. Default values should only be used as a last resort

Biomass and waste according to SIEC

			Primary (P)	Renewable (R)
SIEC Headings			Secondary (S)	Non Renewable (NR)
5		Biofuels		R
51		Solid biofuels		R
511		Fuelwood, wood residues and by-products	P	R
	5111	Wood pellets	P	R
	5119	Other Fuelwood, wood residues and by-products	P	R
512	5120	Bagasse	P	R
513	5130	Animal waste	P	R
514	5140	Black liquor	P	R
515	5150	Other vegetal material and residues	P	R
516	5160	Charcoal	S	R
52		Liquid biofuels	P	R
521	5210	Biogasoline	P	R
522	5220	Biodiesels	P	R
523	5230	Bio jet kerosene	P	R
529	5290	Other liquid biofuels	P	R
53		Biogases	P	R
531		Biogases from anaerobic fermentation	P	R
532		Biogases from thermal processes	P	R
6		Waste	P	
61		Industrial waste	P	NR
62		Municipal waste	P	R/NR

- 2.11 *Boundary of energy products*. The description of the boundary of the universe of energy products is not always straightforward.
- For example, *corncoobs* can be:
 - (1) combusted directly to produce heat;
 - (2) used in the production of ethanol as a biofuel,
 - (3) consumed as food, or
 - (4) thrown away as waste.
- According to the scope of SIEC, corncoobs, as such, are considered energy products for the purpose of energy statistics only in case (1) above, that is when they are combusted directly to produce heat (c.f. paragraph 3.10).
- In all other cases, they either do not fall within the boundary of energy statistics (when used as a source of food), or they enter the boundary of energy statistics as a different product (e.g. ethanol).

Final remarks

- IRES provides methodology to compile energy statistics that are comparable across products and countries, and consistent with other areas of statistics
- Following international recommendations/standards ensures comparability, particularly for data submitted to international organisations (UNSD, APEC, ASEAN...)
- On the other hand, measuring energy should be primarily done to inform development policy
- As such, country needs may call for deviations in the way data are compiled
 - Which should be explained in the metadata
- Thorough coverage of non-traded energy products is important to accurately assess the energy situation



United Nations Statistics Division



Thank you.

<http://unstats.un.org/unsd/energy>